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**Distributing device.**

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**CH-A- 485 507**  
**FR-A- 2 368 422**  
**FR-A- 2 369 904**  
**GB-A- 1 048 827**

**EP 0 476 162 B1**

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## Description

This invention relates to a distributor for spherical or quasi-spherical objects which is intended in particular for the application of cherries, pralines, nuts or other similar articles used to enhance the taste and appearance of, and/or to decorate, food products such as confectionery articles, biscuits or ice creams.

Of the known distributors for quasi-spherical objects, the most widely used are of the pneumatic or mechanical type. Pneumatic distributors comprise either means for randomly withdrawing one of the quasi-spherical objects by suction from a pile or, by contrast, means for pulsing said objects by means of compressed air from cavities into which they have previously been introduced and, in either case, for projecting said object onto the receiving product. Mechanical distributors which are very widely used include versions in which needles take up the objects to be placed on the receiving product from a reserve and subsequently transfer them from this reserve to the product and deposit them thereon.

These known distributors, whether of one type or the other, are attended by the disadvantage of generally poor reliability in operation. For instance, it is usually desirable that only one nut is applied to a cake but many known distributors are unable to ensure this and often apply more than one nut. In addition, mechanical distributors equipped with needles involve a real danger so far as the food products are concerned in that needles or fragments of needles can break or become detached and remain in the product without any possibility of detection at the moment the incident occurs, making the end product particularly dangerous to eat. In view of these disadvantages, distribution is still generally done by hand but this involves considerable labour costs.

The present invention obviates these disadvantages by providing an apparatus and method for distributing quasi-spherical objects such as cherries, nuts or pralines, preferably not sticky, capable of applying them to food products one at a time.

According to the present invention there is provided an apparatus for distributing quasi-spherical objects onto a food product comprising

- a) a vibrating feeder for quasi-spherical objects having one or more outfeed chutes,
  - b) one or more vertical transport tubes positioned below the outfeed chutes,
  - c) a first plate provided with one or more spaced pockets each pocket having two openings one capable of aligning with the end of an outfeed chute and the other capable of aligning with the upper opening of a transport tube,
  - d) a second plate below the first plate provided with one or more spaced holes each of which is capable of aligning with the upper opening of a transport tube,
- either the first plate or the second plate being adapted to oscillate so that in one direction of oscillation, an opening in a pocket of the first plate, a hole of the second plate and the upper opening of a transport tube are in alignment enabling quasi-spherical objects to fall one at a time by gravity from a pocket into a transport tube, and
- e) means for applying the quasi-spherical objects onto the food product.

A vibrating feeder is a conventional device available commercially consisting of a hopper in the form of a hollow cylinder with narrow spiral lanes around the wall terminating in one or more usually horizontal outfeed chutes at the upper end. During the vibrating which is usually carried out magnetically, the quasi-spherical objects travel along the lanes to the outfeed chutes. In the present invention, there are preferably from 3 to 5 outfeed chutes depending upon the product size and the feeder diameter. The size of the cylinder and the width of the lanes may vary according to the size of the quasi-spherical objects. The quasi-spherical objects are preferably size graded before feeding into the vibrating feeder.

In a preferred embodiment of the present invention there is provided an apparatus for distributing quasi-spherical objects on to a food product comprising a vibrating feeder having one or more outfeed chutes, or one or more vertical transport tubes positioned below and offset laterally from the outfeed chutes, an oscillating sliding device formed with one or more pockets with openings adapted to align alternately with the ends of the outfeed chutes and the upper openings of the transport tubes, positioned between the oscillating sliding device and the transport tubes is a fixed plate provided with one or more holes directly above the upper openings of the transport tubes, and means for applying the quasi-spherical objects onto the food product.

In the preferred embodiment of the present invention, the sliding device oscillates so that in one direction of oscillation, one opening in a pocket comes into alignment with the end of an outfeed chute and in the opposite direction of oscillation the other opening in a pocket comes into alignment with the upper opening of a transport tube. When there is more than one outfeed chute, the ends are spaced from one another and preferably the number of transport tubes is equal to the number of outfeed chutes. When there are a plurality of transport tubes and outfeed chutes the upper openings of the transport tubes are preferably positioned opposite the spaces between the outfeed chutes.

The means for applying the quasi-spherical objects onto the food product may advantageously be an ap-

plying head such as described in EUR-A-0280746.

The present invention also provides a process for distributing quasi-spherical objects onto a food product which comprises feeding the quasi-spherical objects to a vibrating feeder having one or more outfeed chutes, causing the vibrating feeder to vibrate so that the quasi-spherical objects travel along the outfeed chutes, oscillating either

- a) a first plate provided with one or more spaced pockets each pocket having two openings one capable of aligning with the end of an outfeed chute enabling quasi-spherical objects to pass into a pocket, and the other capable of aligning with the upper opening of a transport tube or
- b) a second plate below the first plate provided with one or more spaced holes each of which is capable of aligning with the upper opening of a transport tube, so that in one direction of oscillation an opening in a pocket of the first plate, a hole of the second plate and the upper opening of a transport tube are in alignment enabling the quasi-spherical objects to fall one at a time by gravity from a pocket into a transport tube from where they are conveyed to the food product.

The present invention provides in a preferred embodiment a process for distributing quasi-spherical objects on to a food product which comprises feeding the quasi-spherical objects to a vibrating feeder having a one or more outfeed chutes, causing the vibrating feeder to vibrate so that the quasi-spherical objects travel along the outfeed chutes, oscillating a sliding device positioned between the ends of the outfeed chutes and one or more transport tubes positioned below and offset laterally from the outfeed chutes, the sliding device being formed with one or more pockets with openings adapted to align alternately with the ends of the outfeed chutes and the upper openings of the transport tubes so that at each oscillation one quasi-spherical object passes from the end of an outfeed chute into a pocket and then via a hole in a fixed plate positioned between the oscillating sliding device and the transport tubes to a transport tube from where it is applied to the food product.

The present invention will now be further illustrated by way of example only with reference to the accompanying drawings in which

- Figure 1 represents a diagrammatic side view of an apparatus according to the invention,
- Figure 2 represents a diagrammatic top view of the same apparatus,
- Figure 3 represents a view of Figure 1 looking in the direction of the arrows A-A, and
- Figure 4 represents a view of Figure 1 looking in the direction of the arrows B-B.

Referring to the drawings, the apparatus comprises a vibrating feeder 10 having a diameter of from 250 to 450 mm with three spaced outfeed chutes 11, 12 and 13 along which travel nuts 14. Positioned perpendicular to the upper ends of the outfeed chutes is a plastic sliding device 15 having square pockets 16 each with a first opening 17 shown opposite the ends of the outfeed chutes 11, 12, 13 in Figure 2. Positioned below the sliding device are vertical transport tubes 18 and between the sliding device and transport tubes is a fixed plate 19 with holes 20 positioned directly above the upper openings of the transport tubes 18. A second opening 21 in each square pocket 16 is shown facing the fixed plate 19 in Figure 4. An applying head 22 is positioned above a belt 23 conveying biscuits 24.

In operation, the nuts 14 are size graded and filled into the vibrating feeder 10 the vibration of which causes the nuts to travel along the outfeed chutes 11, 12 and 13 to enter the pockets 16 at the opening 17. The sliding device 15 oscillates in the direction of the arrow A in Figure 2 firstly to the left so that the pockets each containing one nut move to a position above the transport tubes 18, where the second opening 21 of each pocket comes into alignment with the upper opening of each transport tube whereupon one nut passes through the second opening 21 of each pocket 16, then through a hole 20 in the fixed plate 19 and finally enters a transport tube 18. In this position the solid parts of the sliding device between the pockets are situated opposite the ends of the outfeed chutes and effectively form a closure to prevent any nuts leaving the ends of the outfeed chutes. The sliding device then oscillates in the reverse direction so that the pockets are once again opposite the ends of the outfeed chutes where one nut enters each pocket and the process is repeated.

The nuts in the transport tubes 18 are then fed one at a time by means of an applying head 22 to biscuits 24 travelling on the conveyor belt 23 and the whole apparatus is synchronised to ensure that only one nut is embedded in each biscuit.

## Claims

1. An apparatus for distributing quasi-spherical objects on to a food product comprising
  - a) a vibrating feeder (10) for quasi-spherical objects having one or more outfeed chutes (11,12,13),
  - b) one or more vertical transport tubes (18) positioned below the outfeed chutes,
  - c) a first plate (15) provided with one or more spaced pockets (16) each pocket having two openings one capable of aligning with the end of an outfeed chute (11,12,13) and the other capable of aligning

with the upper opening of a transport tube (18),

d) a second plate (19) below the first plate (15) provided with one or more spaced holes each of which is capable of aligning with the upper opening of a transport tube (18),

either the first plate (15) or the second plate (19) being adapted to oscillate so that in one direction of oscillation, an opening in a pocket (16) of the first plate, a hole of the second plate (19) and the upper opening of a transport tube (18) are in alignment enabling quasi-spherical objects to fall one at a time by gravity from a pocket (16) to a transport tube (18), and

e) means (22) for applying the quasi-spherical objects onto the food product.

2. An apparatus according to claim 1 comprising a vibrating feeder (10) having one or more outfeed chutes (11,12,13), one or more vertical transport tubes (18) positioned below and offset laterally from the outfeed chutes (11,12,13), an oscillating sliding device (15) formed with one or more pockets (16) adapted to align alternately with the ends of the outfeed chutes (11,12,13) and upper openings of the transport tubes (18), positioned between the oscillating sliding device (15) and the transport tubes (18) is a fixed plate (19) provided with one or more holes directly above the upper openings of the transport tubes (18), and means (22) for applying the quasi-spherical objects onto the food product.
3. An apparatus according to claim 1 wherein the vibrating feeder (10) has from 3 to 5 outfeed chutes.
4. An apparatus according to claim 1 wherein when there is more than one outfeed chute the ends are spaced from one another.
5. An apparatus according to claim 1 wherein the number of transport tubes (18) is equal to the number of outfeed chutes.
6. An apparatus according to claim 2 wherein there are a plurality of transport tubes and outfeed chutes, the upper openings of the transport tubes are positioned opposite the spaces between the outfeed chutes.
7. A process for distributing quasi-spherical objects on to a food product which comprises feeding the quasi-spherical objects to a vibrating feeder (10) having one or more outfeed chutes (11,12,13), causing the vibrating feeder (10) to vibrate so that the quasi-spherical objects travel along the outfeed chutes, oscillating either
  - a) a first plate (15) provided with one or more spaced pockets (16) each pocket (16) having two openings one capable of aligning with the end of an outfeed chute (11,12,13) enabling quasi-spherical objects to pass into a pocket (16) and the other capable of aligning with the upper opening of a transport tube (18) or
  - b) a second plate (19) below the first plate (15) provided with one or more spaced holes each of which is capable of aligning with the upper opening of a transport tube (18)
 so that in one direction of oscillation an opening in a pocket (16) of the first plate (15), a hole of the second plate (19) and the upper opening of a transport tube (18) are in alignment enabling the quasi-spherical objects to fall one at a time by gravity from a pocket (16) into a transport tube (18) from where they are conveyed to the food product.
8. A process for distributing quasi-spherical objects on to a food product according to claim 7 which comprises feeding the quasi-spherical objects to a vibrating feeder (10) having one or more outfeed chutes (11,12,13), causing the vibrating feeder (10) to vibrate so that the quasi-spherical objects travel along the outfeed chutes (11,12,13), oscillating a sliding device (15) positioned between the ends of the outfeed chutes (11,12,13) and one or more transport tubes (18) positioned below and offset laterally from the outfeed chutes (11,12,13), the sliding device (15) being formed with one or more pockets (16) with openings adapted to align alternately with the ends of the outfeed chutes (11,12,13) and the upper openings of the transport tubes (18) so that at each oscillation one quasi-spherical object passes from the end of an outfeed chute (11,12,13) into a pocket (16) and then via a hole in a fixed plate (19) positioned between the oscillating sliding device (15) and the transport tubes (18) to a transport tube (18) from where it is applied to a food product.
9. A process according to claim 7 wherein the quasi-spherical objects are size graded before being fed into the vibrating feeder (10).

## Patentansprüche

1. Vorrichtung zur Verteilung quasi-kugelförmiger Gegenstände auf einem Nahrungsmittelprodukt, mit
  - a) einer vibrierenden Zuführeinrichtung (10) für quasi-kugelförmige Gegenstände, die eine oder mehrere Ausgaberutschen (11,12,13) aufweist,
  - b) einer oder mehreren vertikalen Transportröhren (18), die unterhalb der ausgaberutschen angeordnet sind,
  - c) einer ersten Platte (15), die mit einer oder mehreren voneinander beabstandeten Taschen (16) versehen ist, wobei jede Tasche zwei Öffnungen aufweist, wobei eine in der Lage ist, mit dem Ende einer Ausgaberutsche (11,12,13) zu fluchten, und wobei die andere in der Lage ist, mit der oberen Öffnung einer Transportröhre (18) zu fluchten,
  - d) einer zweiten Platte (19) unterhalb der ersten Platte (15), die mit einem oder mehreren voneinander beabstandeten Löchern versehen ist, wobei jedes Loch in der Lage ist, mit der oberen Öffnung einer Transportröhre (18) zu fluchten, wobei entweder die erste Platte (15) oder die zweite Platte (19) angepaßt ist, so zu schwingen, daß in einer Richtung der Schwingung eine Öffnung in einer Tasche (16) der ersten Platte (15) ein Loch der zweiten Platte (19) und die obere Öffnung einer Transportröhre (18) fluchten, um es den quasi-kugelförmigen Gegenständen zu ermöglichen, jeweils einzeln aufgrund der Schwerkraft von einer Tasche (16) in eine Transportröhre (18) zu fallen, und
  - e) Mitteln (22) zur Aufbringung der quasi-kugelförmigen Gegenstände auf das Nahrungsmittelprodukt.
2. Vorrichtung nach Anspruch 1 mit einer vibrierenden Zuführeinrichtung (10), die eine oder mehrere Ausgaberutschen (11,12,13) aufweist, einer oder mehreren vertikalen Transportröhren (18), die unter den Ausgaberutschen (11,12,13) und seitlich dazu versetzt von den Ausgaberutschen angeordnet sind, einer schwingenden Gleitereinrichtung (15), die eine oder mehrere Taschen (16) aufweist, die angepaßt sind, abwechselnd mit den Enden der Ausgaberutschen (11,12,13) zu fluchten, und oberen Öffnungen der Transportröhren (18), wobei zwischen der schwingenden Gleitereinrichtung (15) und den Transportröhren (18) eine feste Platte (19) angeordnet ist, die mit einem oder mehreren Löchern unmittelbar über den oberen Öffnungen der Transportröhren (18) vorgesehen ist, und Mitteln (22) zum Aufbringen der quasi-kugelförmigen Gegenstände auf das Nahrungsmittelprodukt.
3. Vorrichtung nach Anspruch 1, wobei die vibrierende Zuführeinrichtung (10) drei bis fünf Ausgaberutschen aufweist.
4. Vorrichtung nach Anspruch 1, bei der, wenn mehr als eine Ausgaberutsche vorhanden ist, die Enden voneinander beabstandet sind.
5. Vorrichtung nach Anspruch 1, wobei die Anzahl der Transportröhren (18) gleich der Anzahl der Ausgaberutschen ist.
6. Vorrichtung nach Anspruch 2, bei der, wenn eine Vielzahl von Transportröhren und Ausgaberutschen vorhanden ist, die oberen Öffnungen der Transportröhren gegenüber den Freiräumen zwischen den Ausgaberutschen angeordnet sind.
7. Verfahren zur Verteilung quasi-kugelförmiger Gegenstände auf einem Nahrungsmittelprodukt, das die Zufuhr mit quasikugelförmigen Gegenständen zu einer vibrierenden Zuführeinrichtung (10) umfaßt, die eine oder mehrere Ausgaberutschen (11,12,13) aufweist, wobei die vibrierende Zuführeinrichtung (10) verlaßt wird, zu vibrieren, so daß die quasi-kugelförmigen Gegenstände entlang der Ausgaberutschen laufen, wobei entweder
  - a) eine erste Platte (15) schwingt, die mit einem oder mehreren voneinander beabstandeten Taschen (16) versehen ist, wobei jede Tasche zwei Öffnungen hat, wobei eine Öffnung in der Lage ist, mit dem Ende einer Ausgaberutsche (11,12,13) zu fluchten, um es den quasi-kugelförmigen Gegenständen zu ermöglichen, in eine Tasche (16) zu gelangen, und wobei die andere Öffnung in der Lage ist, mit der oberen Öffnung der Transportröhre (18) zu fluchten, oder
  - b) eine zweite Platte (19) unter der ersten Platte (15) schwingt, die mit einem oder mehreren voneinander beabstandeten Löchern versehen ist, wobei jedes Loch in der Lage ist, mit der oberen Öffnung einer Transportröhre (18) zu fluchten so daß in einer Richtung der Schwingung eine Öffnung in einer Tasche (16) der ersten Platte (15), ein Loch der zweiten Platte (19) und die obere Öffnung einer Transportröhre (18) fluchten, um es den quasi-

kugelförmigen Gegenständen zu ermöglichen, jeweils einzeln aufgrund der Schwerkraft von einer Tasche (16) in eine Transportröhre (18) zu fallen, von der aus sie zum Nahrungsmittelprodukt befördert werden.

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8. Verfahren zur Verteilung quasi-kugelförmiger Gegenstände auf einem Nahrungsmittelprodukt nach Anspruch 7, das die Zuführung von quasi-kugelförmigen Gegenständen zu einer vibrierenden Zuführeinrichtung (10) umfaßt, die eine oder mehrere Ausgaberutschen (11,12,13) aufweist, wobei die vibrierende Zuführeinrichtung (10) veranlaßt wird, zu vibrieren, so daß die quasi-kugelförmigen Gegenstände entlang
- 10 der Ausgaberutschen (11,12,13) laufen, weiterhin das Schwingen einer Gleitereinrichtung (15) umfaßt, die zwischen den Enden der Ausgaberutschen (11,12,13) und einer oder mehreren Transportröhren (18) angeordnet ist, die unter den Ausgaberutschen (11,12,13) und seitlich versetzt dazu angeordnet sind, wobei die Gleitereinrichtung (15) eine oder mehrere Taschen (16) mit Öffnungen aufweist, die angepaßt sind, um abwechselnd mit den Enden der Ausgaberutschen (11,12,13) und den oberen Öffnungen der Transportröhren (18) zu fluchten, so daß bei jeder Schwingung ein quasi-kugelförmiger Gegenstand vom Ende einer Ausgaberutsche (11,12,13) in eine Tasche (16) und dann über ein Loch in einer festen Platte (19), die zwischen der schwingenden Gleitereinrichtung (15) und den Transportröhren (18) angeordnet ist, in eine Transportröhre (18) läuft, von der aus er auf das Nahrungsmittelprodukt aufgebracht wird.
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9. Verfahren nach Anspruch 7, wobei die quasi-kugelförmigen Gegenstände nach ihrer Größe sortiert werden, bevor sie der vibrierenden Zuführeinrichtung zugeführt werden.
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# Revendications

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1. Appareil pour distribuer des objets quasi sphériques sur un produit alimentaire, comportant
- a) un distributeur vibrant (10) pour objets quasi sphériques, ayant un ou plusieurs couloirs (11, 12, 13) de sortie,
- b) un ou plusieurs tubes verticaux (18) de transport placés au-dessous des couloirs de sortie,
- 30 c) une première plaque (15) pourvue d'un ou plusieurs alvéoles espacées (16), chaque alvéole ayant deux ouvertures dont l'une peut être alignée avec l'extrémité d'un couloir (11, 12, 13) de sortie et l'autre peut être alignée avec l'ouverture supérieure d'un tube (18) de transport,
- d) une seconde plaque (19) au-dessous de la première plaque (15), présentant un ou plusieurs trous espacés pouvant être alignés chacun avec l'ouverture supérieure d'un tube (18) de transport,
- 35 la première plaque (15) ou la seconde plaque (19) étant conçue pour osciller de manière que, dans un sens de l'oscillation, une ouverture dans un alvéole (16) de la première plaque, un trou de la seconde plaque (19) et l'ouverture supérieure d'un tube (18) de transport soient en alignement, permettant à des objets quasi sphériques de tomber, l'un à la fois, par gravité depuis un alvéole (16) vers un tube de transport (18), et
- 40 e) des moyens (22) destinés à poser les objets quasi sphériques sur le produit alimentaire.
2. Appareil selon la revendication 1, comportant un distributeur vibrant (10) ayant un ou plusieurs couloirs (11, 12, 13) de sortie, un ou plusieurs tubes verticaux (18) de transport placés au-dessous et décalés latéralement des couloirs (11, 12, 13) de sortie, un dispositif oscillant et coulissant (15) formé de façon à
- 45 présenter un ou plusieurs alvéoles (26) conçus pour s'aligner en alternance avec les extrémités des couloirs (11, 12, 13) de sortie et des ouvertures supérieures des tubes (18) de transport, une plaque fixe (19), placée entre le dispositif oscillant et coulissant (15) et les tubes (18) de transport, étant pourvue d'un ou plusieurs trous directement au-dessus des ouvertures supérieures des tubes (18) de transport, et des moyens (22) destinés à poser les objets quasi-sphériques sur le produit alimentaire.
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3. Appareil selon la revendication 1, dans lequel le distributeur vibrant (10) comporte 3 à 5 couloirs de sortie.
4. Appareil selon la revendication 1, dans lequel, lorsqu'il y a plus d'un couloir de sortie, les extrémités sont espacées les unes des autres.
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5. Appareil selon la revendication 1, dans lequel le nombre de tubes (18) de transport est égal au nombre de couloirs de sortie.
6. Appareil selon la revendication 2, dans lequel il y a plusieurs tubes de transport et plusieurs couloirs de sortie, les ouvertures supérieures des tubes de transport étant placées en opposition aux espaces entre

les couloirs de sortie.

- 5 7. Procédé pour distribuer des objets quasi sphériques sur un produit alimentaire, qui consiste à amener les objets quasi sphériques à un distributeur vibrant (10) ayant un ou plusieurs couloirs (11, 12, 13) de sortie, à faire vibrer le distributeur vibrant (10) afin que les objets quasi sphériques se déplacent le long des couloirs de sortie, à faire osciller soit

  - 10 a) une première plaque (15) présentant un ou plusieurs alvéoles espacées (16), chaque alvéole (16) ayant deux ouvertures dont l'une peut être alignée avec l'extrémité d'un couloir (11, 12, 13) de sortie, permettant à des objets quasi sphériques de pénétrer dans un alvéole (16), et dont l'autre peut être alignée avec l'ouverture supérieure d'un tube (18) de transport, soit
  - 15 b) une seconde plaque (19) au-dessous de la première plaque (15), présentant un ou plusieurs trous espacés pouvant être alignés chacun avec l'ouverture supérieure d'un tube (18) de transport, de manière que, dans un sens d'oscillation, une ouverture d'un alvéole (16) de la première plaque (15), un trou de la seconde plaque (19) et l'ouverture supérieure d'un tube (18) de transport soient en alignement, permettant aux objets quasi sphériques de tomber, l'un à la fois, par gravité, depuis un alvéole (16) dans un tube (18) de transport d'où ils sont transportés jusqu'au produit alimentaire.
- 20 8. Procédé pour distribuer des objets quasi sphériques sur un produit alimentaire selon la revendication 7, qui consiste à amener les objets quasi sphériques à un distributeur vibrant (10) ayant un ou plusieurs couloirs (11, 12, 13) de sortie, à faire vibrer le distributeur vibrant afin que les objets quasi sphériques se déplacent le long des couloirs (11, 12, 13) de sortie, à faire osciller un dispositif coulissant (15) placé entre les extrémités des couloirs (11, 12, 13) de sortie et un ou plusieurs tubes de transport (18) placés au-dessous et décalés latéralement des couloirs (11, 12, 13) de sortie, le dispositif coulissant (15) étant formé

25 de façon à présenter un ou plusieurs alvéoles (16) ayant des ouvertures conçues pour s'aligner latéralement avec les extrémités des couloirs (11, 12, 13) de sortie et avec les ouvertures supérieures des tubes (18) de transport, afin qu'à chaque oscillation, un objet quasi sphérique passe de l'extrémité d'un couloir (11, 12, 13) de sortie dans un alvéole (16) puis, par l'intermédiaire d'un trou d'une plaque fixe (19) placée entre le dispositif oscillant et coulissant (15) et les tubes (18) de transport, arrive à un tube (18) de transport duquel il est posé sur un produit alimentaire.

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9. Procédé selon la revendication 7, dans lequel les objets quasi sphériques sont classés par dimensions avant d'être amenés au distributeur vibrant (10).

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